Mr. Warden Kenrick has, in his report, given a very interesting summary of the results of dredging in the sub-districts within the jurisdiction of the Courts over which he presides in the West Coast Inspection District.

During the year there were six fatalities in connection with dredging operations—viz., three in the West Coast district and three in the Southern district. This is a decrease of three as compared with the previous year. Of the six fatalities referred to, four were by drowning, one by being caught in machinery, and one by a fall on to the deck from an elevated position.

Construction of Dredges.

Generally speaking, and with the exception of a new departure illustrated and described later on, there is very little to note under this heading. The experience gained on the Clutha River has shown the necessity of lengthening the ladders of several dredges in order to work the ground to better advantage. It has been asserted that one reason of several of the dredges in the Clyde–Cromwell Gorge not getting the results anticipated, is that the ladders are not long enough, nor the machinery generally strong enough, to tear through and work below a hard crust which is said to overlie the bottom and thus cover the richer gold-bearing wash.

One of the largest and most recent dredges put to work is the "Rising Sun." This is placed on a claim on the upper part of the Clutha River (about two miles above Cromwell), which includes an area of both river and river-banks. The dredge has been built to the design of Mr. F. W. Payne, Consulting Engineer, Dunedin, to whom I am indebted for the drawing and also the following description :—

"The hull is 118 ft. long by 35 ft. 6 in. beam, by 7 ft. deep; built throughout of blue-gum frames and kauri planking.

"The boiler is of the externally-fired multitubular type, 15 ft. long by 5 ft. diameter, with a working-pressure of 150 lb. per square inch. This boiler was specially designed by Mr. Payne to burn the local lignite, and has an exceptionally large grate-area. The objection to the externally-fired type of boiler—that it is apt to burn, due to collection of sediment, when used in connection with dredges—has been overcome by a special arrangement by which the feed-water is vapourised immediately on entering the boiler, and the solids deposited in a funnel or hopper from which they can he blown out at intervals by the engineer in charge. The economy of this boiler is evident, considering that, though this is the largest gold-dredge in New Zealand, the coal-consumption is only seventeen bags of lignite per eight-hour shift, a saving, as compared with much smaller dredges, of over seven bags per eight hours. (Sixteen bags equal one ton.) Taking an average of 80 indicated horse-power, this gives a consumption of $3\frac{3}{4}$ lb. per hour per horse-power.

"The engine is by Marshall and Sons (Limited); compound condensing with cylinders of 10 in. and 16 in. diameter by 18 in. stroke, and indicating 100-horse power.

"The ladder is 82 ft. long from centre of pivoting-shaft to centre of bottom tumbler.

"The buckets are of 7 cubic feet capacity.

"The winches consist of 6 barrels and a surging-drum and are driven by a pair of Marshall's vertical engines fitted with reversing-gear.

"The screen is 31 ft. long by 4 ft. 6 in. diameter, driven by friction-rollers.

"The tables are of 360 square feet area and are provided with independent sparge-pipes at head. The water for the tables is supplied by a 12 in. centrifugal pump driven direct from the fly-wheel of main engine.

"The elevator is one of Payne's patent centrifugal type, and consists of two striking-faces, the outside diameter of the path of these faces being 3 ft. 1 in., the width of striking-faces between the side plate is 2 ft. 6 in., and the speed is 300 revolutions per minute. It is driven by a counter-shaft off the first-motion shaft of dredge; fast and loose pulleys are fitted on elevator-shaft, also an over-riding gear which makes the elevator a free wheel, as otherwise, upon any slackening of speed of engine and particularly when stopping, the momentum of the elevator would destroy the belt driving it. The elevator has proved quite capable of dealing with the exceptionally large quantity of stuff put through by the large buckets of this dredge, and has never once caused a block or exhibited signs of overloading even when the buckets have been charged to overflowing. The stacking capabilities of the elevator are in excess of requirements, as is proved by the fact that recently the dredge was able to work two weeks without it, due to the tailings having been propelled so far astern as to allow room to dispose of them for that time without stacking. During this time the coal-consumption remained practically the same as when the elevator was working, the difference being so small that the engineer in charge could not state definitely that any difference existed.

"For the beater-bars (constituting the principal wearing-portions in connection with these elevators) different materials have been tried, but as there is not a wide choice of materials available in the colony, no doubt considerable improvement will shortly be effected by the introduction of a harder class of material such as chrome or manganese castings.

"The tailings-stack is from 20 ft. to 25 ft. high, and owing to being level on top and also tightly packed—due to each individual stone falling with considerable force—this height may be safely taken to contain the same amount of stuff as a stack 30 ft. put up with a bucket-elevator where the stuff is loosely stacked and peaked at top."

Johnson's Submerged-jet Dredge.—A new departure in dredge-mining, applicable, however, to those places only at which hydraulic power is available, has been made by Mr. J. T. Johnson, of Waipori. I have not yet seen this plant at work, but Mr. Johnson has kindly favoured me with drawings for reproduction and also the following description :—

"The principle of the submerged-jet dredge is simply that of the hydraulic elevator adapted to the requirements of a dredge, and consists of ordinary dredge pontoons, divested of boiler, engine, and bucket-ladder, these being replaced by a hydraulically-driven Pelton-wheel to work the winches, an hydraulic elevator in place of a bucket-ladder to raise the material to the shoots, and a breaking-down nozzle working on the submerged face to disentegrate the material.